



THE UNIVERSITY *of* EDINBURGH

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A portfolio of electro-instrumental compositions incorporating multilayered processes for automated live electronics

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A portfolio of electro-instrumental compositions incorporating multilayered processes for automated live electronics

Preface

To the reader:

The music presented here expresses a deeply interconnected relationship between acoustic instrumental sound and computer-produced electro-acoustic material. Throughout this process of research, I was determined to investigate how I could craft an electronic music part, produced in real-time, that maintains counterpoint between the instrumental and non-instrumental sounds.

To explain this relationship, the scores offer a graphic representation of the live-electronics that exemplifies the real-time sounds produced. This presents a “map” for the performers to estimate its behaviour, even though the real-time electronics is always subject to variation at each performance.

A basic form of computerised sensitivity had to be designed in order to make live electronics performable even when the composer was not present. This helped to maintain a unique *liveness* of real-time processing and reinforce an open-access ideology in the music. The compositional process would have to somehow systematise, in software, how I utilise live audio input to create the electronic result.

This initial idea was supported by the intent to produce a more egalitarian distribution of music. With easy-to-run software, freely accessible and clear scores, the possibilities enabling of performances without me there were increased. The technical requirements for realisation are not tied to state-of-the-art technology found in specialized centres of research, where this type of music is often produced, nor to the physical presence of the composer. To realise this, Open Source Free Software had to be embraced and understood in my own practice. I therefore expanded my research into alternative technical possibilities. Incorporating the use of technology that does not financially discriminate, and permits the use of common, old and sometimes discarded equipment to produce and play the pieces.

The pieces of the portfolio show the different routes that I took in order to find the way of working that would suit me the most. It was during this time that I also deepened my skills in computer programming and other tools for the writing of the scores. I also successfully developed a platform to produce the electro-acoustic material in real-time¹.

About a year into the Ph.D., I was given a very constructive critique of my work. It pushed me further into unknown areas of experimentation. I soon realized that the process of systematizing my writing ideas would be the best approach to expand my search. The freshness it produced came with doubt, but the security found in programming the techniques used allowed me to continue experimenting with different algorithms. Some of which are explained below.

While writing “Dianoia” I was able to use the *pdivide*² function in Slippery Chicken to produce a fractal formal division. Other algorithms were crucial for mapping melodic contours³ of recorded voice to specific sets of notes with Fibonacci⁴ transitions in “Long to Reign Over Us”.

1 https://lac.linuxaudio.org/2018/pdf/LAC2018_proceedings.pdf (pg. 13 - 20)

2 https://michael-edwards.org/sc/robodoc/utilities_lsp.html#robo869

3 <https://github.com/JRSV/mapping-melodic-contour>

4 <https://github.com/JRSV/mapping-melodic-contour/blob/master/harmonic-structure-FIB-TRANS.lisp>

As I became better at using these tools, my conceptual ideas started to filter into my music and code. At the same time, this forced me to keep learning how to program more complicated ideas. Harmony, and the insistence of a particular arrangement of it, with variations of timbres or order of appearance, is governed by algorithmic procedures applied in the code. This is the compositional principal used in “Limoj de Mia Kialo”. The piece uses the “C2M”^{5 6} algorithm developed in LISP to create the main material for its construction.

It was around this time that I realized how closely related the programming and the compositional process could be. This new sense of security, based on algorithmic facts, and new-found liberties experienced by this intellectual breakthrough, granted a solid base to start testing more out-of-the-ordinary ideas. This is when my curiosity honed in on finding conceptual and/or philosophical equivalents in my work and I could start to develop macro-musical ideas with philosophical abstract thoughts that could be “represented” with code, and used for the production of a piece.

Ideas about society, economy, the world, and its current affairs have filtered into my music ever since I started composing. However, during this Ph.D. project I found better ways to integrate message, narrative, value, and my own individual thought. Utopic economic and social ideas were conceptualized, *formalized*, coded, and later integrated in the construction process of the musical phrases. The basic idea for the “C2M” algorithm came after thinking of alternative ways of achieving equal distribution of material. Another algorithm which I named “Harmonic Tunnel”⁷ came via reflections on the constant sway of the political pendulum. This was later applied in “Tessellations” and “Limoj de Mia Kialo” to produce fast melodic lines. Each piece is its own scenario, where inspiration based on economic ideas, social structures and thought processes, imagined by myself, are tested in different ways.

This portfolio-based Ph.D. presented me with an opportunity to pro-actively search for the uniqueness in an artistic “language”. In the portfolio you are about to explore, you can hear my compositional voice shift in the following ways:

- Style

My style has evolved by distancing from my educational background and allowing space for a more personal exploration of ideas. The music presented in the portfolio is consequence of my welcoming of different schools of thought. My focus was mainly based in the desire to sound different. My biggest challenge was to accept that difference.

- Writing

My writing relates to the way the ideas are thought of. The production of, and the resulting scores are consequence of abstract ideas and their development. The written music is not only a way to represent sound. It is part of the thought process behind the idea itself.

- Process

Many of these changes are product of a new way of thinking music. I now allow time to develop and explore ideas through drawings, painting, and other manual-artesian activities⁸. These practices sometimes are used for the final score, but its main purpose is to explore ways of observing a musical idea. My work now has more extra musical input for the

5 <https://github.com/JRSV/C2M>

6 http://michael-edwards.org/sc/dw/doku.php?id=sc_as_cac

7 <https://github.com/JRSV/HarmonicTunnel>

8 Refer to “Sammy the Cat” in the Annex.

performer/s. This has opened new doors for exploration including moments of improvisation in my pieces⁹ and electronic jam sessions¹⁰.

- Electronics

With the development of my own tools, my electro-acoustic practice when composing the electronic part is now more flexible. Being able to custom make instruments and how I control them, has provided a richer palette of tools to work with. Allowing me to test different results, and “sculpt” the electronic part when composing it.

As the project ends, I am satisfied with the result of this experience. Admitting it is the most difficult task I have ever set myself. The selected pieces in this portfolio represent the long and complex journey that took place in my intellectual self during the Ph.D. The level of growth that this process has amplified upon me is evident every day. It has taken me through difficult moments in my personal and professional life, and has been the cause of numerous instances of doubt and feelings of defeat. However, this process is not meant to be easy. It is hard not to be aware of the responsibility that academic researchers have when taking on this challenge. The doctorate is an intense and personal struggle that candidates go through with their own ideas and hypotheses. It is only through these stress tests that original thinking and new knowledge come to existence.

9 Refer to “Tessellations” to observe improvisational instructions made with free drawing tools in [NoteAbility Pro](#)

10 <https://www.youtube.com/watch?v=IJAhvBYUR3M>

PORTFOLIO – About the Pieces

1 Closeness is an Opportunity to be Cruel

- String Quartet
- read by Diotima Quartet
- The piece explores the use of microtonal glissandi as the main source of material production. It was written for the reading session that Diotima Quartet held in Edinburgh. It was the first time I had access to a string quartet, and the opportunity was even bigger considering who was playing. The piece is very conservative, as it did not tend to explore, but finally confirm certain ideas that I have been taught along my academic journey. It was because of this that Dr. Edwards so thoughtfully questioned me about it. He made some positive comments on the music and the score, but invited me to step away from any type of musical school. With this observation, I felt that it was time for me to explore deeper into unique conceptual ideas that would produce more original work. I think I will revisit this Quartet in a decade or two, to re-explore and reflect on pivotal moments in life.

2 Dianoia

- Bass Flute / Violin / Cello / T. Sax & Live Electronics
- Premiered by Ensemble Vertixe Sonora
- Dianoia is the first piece in which I strictly followed an algorithmic process to materialize different time structuring ideas. It is also music that was created while attempting to maintain a certain neutrality in the acoustic part, creating musical structures as a placeholders of time, while expanding a subjective idea in the electro-acoustic counterpart in which my imagination can construct with more liberties. Dianoia presented a new type of challenge for me. The piece explores ways to achieve distance from culturally charged materials, instruments or language in order to produce an undetermined originality in the music. Its simplicity is characterized by the use of clusters that cover harmonic areas and feed the computer the signal to process. While writing the piece, my curiosity focused on algorithmic structuring and its influence on the form. Dianoia opened a new way of searching for musical possibilities and pushed me into personal and unique ways of thinking.

3 Long to Reign Over Us

- Trombone & Live Electronics
- Commissioned by Psappha Ensemble and recorded by Tony Boorer
- Long to Reign Over Us for solo trombone and live electronics uses a computer program and other strategies to extract the melodic contour of speeches, rhythmic phrasings from interviews, and texts related to United Kingdom policy and the “Brexit” media turmoil. These contours and rhythms are later used to create complex gestures for the trombone. The real time electronics consist of different modules that interconnect to create electronic textures. This project began an extensive development of a preset system that would become a structural part of my research, and an important tool for my composition practice.

4 Reconstruction

- Piano Solo
- recorded by Karin Schistek

“Reconstruction” for piano solo is a short experiment that I composed after going through a difficult period in the Ph.D. The piece explores the interaction of four basic, and very recognisable musical materials that permutate in order of appearance, to try to excite different resonances in the piano. I was encouraged to write this piece by my then supervisor Dr. Michael Edwards after discussing a different piece which I found particularly interesting. Dr. Edwards then suggested I try to compose with the same principles, and so I did. The resulting music turned out to be the thing I needed to turn the page on that difficult period mentioned before, and to trigger new compositional ideas.

5 Tessellations

- Alto Saxophone & Live Electronics
- written for Christian Ferlaino
- Tessellations for alto saxophone and live electronics explores a complex idea of *unbiased* music, a definition of mine consisting of an attempt to neutralize musical objects by stripping them from any cultural reference that they might have. Strongly linked to a lack of identity, the product of a life of constant migration and social displacement, it is a strong motivation for me to rediscover musical values this way. Through repetition and timbre modulation I try to neutralize the classical harmonic weight that the scales used have, insisting that the material used is nothing but that: a scale, a chord, a note. By avoiding directionality, and by using the electronics to push a different type of discourse, I wish to re-frame the materials without any cultural context. To achieve this entirely is of course an unreachable goal, however it is an unsolvable problem to continue further exploration of material. The music structures are processed in different ways to discover what might come out of them. I then allow taste and my own subjective decisions to guide the narrative. To my surprise, listening to different results will unavoidably trigger cultural references, which I then welcome as they are rediscovered by a different approach in the composition practice. Likewise, the piece welcomes the input of the performer, as it requires improvisation moments in which I encourage spontaneous creation, hoping to find his/her own musical baggage.

6 Audance III

- Harp & Live Electronics
- written for Polly Harris
- Audance III, for harp and live electronics, is the third of a series of pieces that were written as “study” pieces for solo instrument players who want to explore interaction between performer and computer. The pieces are not easy, as they are not intended to be study pieces for the instrument but rather for the computer part. The name is in honour of Max Mathews, and the mass-improvisations he produced called “Audances”. Audance III was composed with a LISP program that found the only non-transposable chords available in the harp with the use of the pedals.

7 Limoj de Mia Kialo (Perc. & L.E.)

- Percussion & Live Electronics – 4 Movements
- written for Pascal Pons (computer emulation provided for the 3 last movements)
- Limoj de Mia Kialo (perc. & live electronics) is a long, complex piece that explores the most mature ideas that have been worked on during the Ph.D. The piece was composed with a unique musical algorithm that distributes the acoustic musical material, creating patterns based on the arguments given. The patterns are a sonic materialization of an equal distribution of this material in the instrumental part. It was developed on the LISP programming language running Slippery Chicken. The structures created maintain

proportional relations between them, that allow me to construct complex rhythmic patterns by superimposing and/or expanding them. The algorithm produces a vast amount of material that is later organized, sometimes freely, to produce the music.

8 Limoj de Mia Kialo (Orch. & L.E.)

- Orchestra & Live Electronics
- written for Pascal Pons and the St. Georgen/Furtwangen youth orchestra.
- Limoj de Mia Kialo (orchestra and live electronics version) was composed as an expansion of the musical material which I considered interesting in the Percussion version. The piece utilizes the same system of composition, but the materials were tweaked to simplify the complex rhythmic structures. The resulting music proved to me that the system used to compose both pieces is interestingly flexible, as it produces very different results.

ANNEXE

Audance I / Studio I (hard copy included)

(work in progress) Score Included

Audance I is a piece for flute and live electronics, which follows the main idea of Audance III (in portfolio). It consists of musical material which I wrote to have a small degree of difficulty, maintaining the basic idea of “study”. The score/study included is finished, but it was never performed, and the computer patch was not finished. However, it tries to encapsulate the idea of being “entertaining to play”, as is evident in the score, and in the modular decisions that the player must take when playing it.

Audance II (hard copy included)

(work in progress) Score Included

Audance II was written for guitar and live electronics, however, for the same reasons Audance I was not played, the player who showed interest in working with me suddenly decided not to continue the project. The piece reached a stage where the music was written down as a draft, but I was never able to work on it further. However, the computer program is finished, and was the second implementation of the RSVP system developed during the Ph.D. This particular implementation of RSVP would be important because it is the patch that I used to develop the “Baldness” project.

Sammy the Cat (hard copy included)

10 minutes (approx) Audio and Graphic Score Included

a graphic score for improvisation

Russell Wimbish

Sammy the Cat is a graphic score exploring the freedom of conceptual liberty. This piece tries to materialize an undefinable way of imagining things while I construct music. In it, I explored the liberties of capturing this undefinable musical idea, that cannot be contained in western notation, by using a different format to encode the mental musical object. Sammy the Cat explores different thoughts on structure, form and variation. This piece is of great importance because it widened my creative practice in pieces to come. My musical practice now involves a craftsmanship process that proposes a different way of working on the musical image. Manual activity and time away from the computer, the numbers and the

algorithms, allow my mind to work on a stage in between the music in my head and the process of encoding it in the score. It has become a moment where I explore with musical colors, shapes and spaces by painting, cutting, drawing and pasting.

Other Musical Ideas

Baldness

Baldness is a duo formed by Louis McHough (guitar) and myself during the Ph.D. in which we worked on spontaneous creation. The reason this project became important for my research is that in it, I decided to use the computer patch developed for “Audance II”. The patch uses the RSVP system, which allowed me to experience in a very tactile way what are the limits of the system. At first, this generated tweaks and bug corrections, but soon it became a moment where I could also brainstorm different ways of generating material in real time. Consequently, this produced a big percentage of the improvements that went into the RSVP system.

<https://soundcloud.com/user-626537412>

RSVP Pure Data Patching Framework

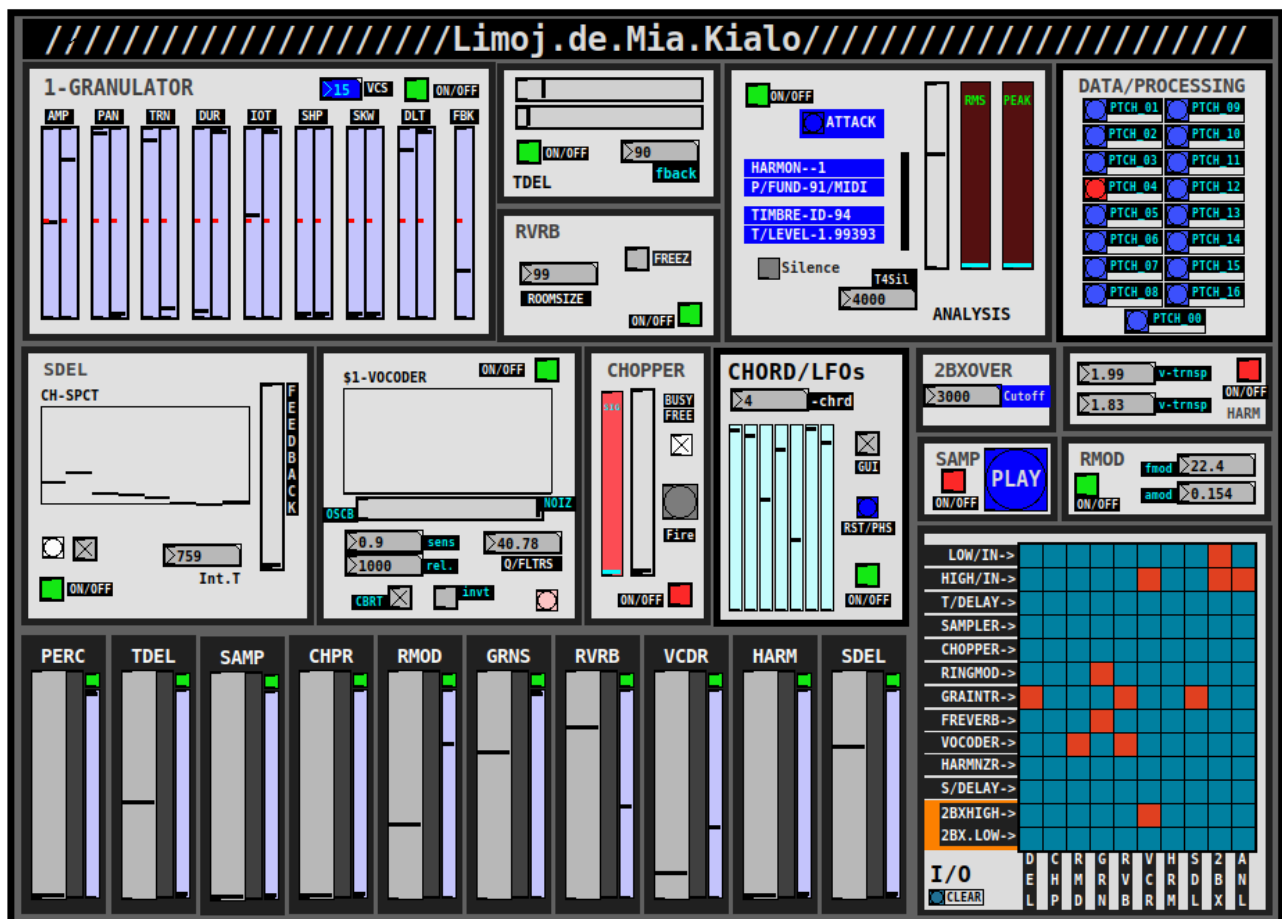
- How it Works

The RSVP patching framework is the product of a 3 year development in which I integrated a custom solution for managing presets in Pure Data. This initial project grew to an environment in which I am able to develop new instruments, and ways of interfacing with them in real time. RSVP has become the structural, technical component behind all my live electronics processing software. This section will briefly describe its structure and how it works.

The framework is divided in 2 sections, in which only the main window is available at start-up. This allows me to present a simple interface for performance, where the user has only the necessary controls for this scenario. It considers rehearsing, setting and resetting, sound diffusion, and recording to be the only aspects the player and/or technician really need to worry about when executing the piece.



The Live Electronics window contains the Digital Signal Processing (DSP) units. The user may think of this section as the place where the DSP units are loaded and interconnected. It allows the creation and fast connection of units, and the easy development of instruments during the production process. There is also a specific place where data can be manipulated, and even compartmentalized, for a determined musical section. The window is accessed by clicking on the button labelled “L.E.” on the lower – right of the main window.



When the processing interface is loaded, it is easy to observe how the processors are organized, and the parameters that can be controlled in each. The patches always load a connection matrix, and include faders that are linked to every module by name.

In order to use RSVP, and any version of it according to the piece that is being played, the user must first install and set-up Pure Data for it to be working with the sound card, and loading the necessary externals that are used in the projects. All of these can be accessed inside Pd via the “deken” plug-in manager. These initial steps are not going to be addressed in this short introduction. However, the code of the last version of the framework used is included in the USB drive included in this submission.

Once Pd is running in the computer, the user can open the file that contains the suffix “.Master.pd” in its name. In this case, the files included are the last version used in the piece “limoj de mia kialo”, and the file to open is named LMK.Master.pd. This will load the previously explained windows, allowing the use of RSVP. The software is intended to make pieces easier to be executed, while not limiting the complexity of the processing used. The interface is planned to be intuitive and self explanatory. For further details of how it is designed and used, please refer to the paper presented in the LAC2018 – Berlin. This is included in the annex folder in the USB submitted.

- *Pure Data Code*
- Linux Audio Conference 2018 Paper

PORTFOLIO FOLDER (DIGITAL SCORES)

MEDIA FOLDER

- Audio Folder

– Portfolio Folder

- * *1 Closeness is an Opportunity to be Cruel (04:54)*
- * *2 Dianoia (09:16)*
- * *4 Reconstruction (04:53)*
- * *5 Tessellations (13:44)*
- * *6 Audance III (12:49)*
- * *7 Limoj de Mia Kialo – perc. & l.e. (24:12) (no first movement)*
- * *8 Limoj de Mia Kialo – orch. & l.e. (09:26)*

– Annex Folder

- * *Sammy the Cat (10:05)*
- * *Baldness (30:27)*

-Video Folder

– Portfolio Folder

- * *2 Dianoia (09:16)*
- * *3 Long to Reign Over Us (08:10)*

– Annex Folder

- * *Linux Audio Conference 2018 Paper Presentation (25:37)*
- * *Pd Code*